REMARKS

Upon entry of this amendment, claims 1-19 are all the claims pending in the application. Claim 19 has been added. No new matter has been added. In view of the following remarks, reconsideration is respectfully requested.

I. Claim Rejections under 35 U.S.C. § 103 (a)

Claims 1-18 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Nakamura et al. (U.S. 6,185,312) in view of Barton (U.S. 6,047,374).

In response to the Final Office Action dated May 6, 2004, Applicants responded by arguing that the cited prior art fails to disclose or suggest numerous features recited in the claims. In the Advisory Action dated March 25, 2005, the Examiner responded by pointing to the same passages of the prior art references that were cited in the Final Office Action and took the position that such passages disclose the features recited in the claims. Applicants respectfully disagree.

For example, claim 1 recites the feature of a key data embedding portion operable to embed key data in transform coefficients of a lowest frequency band (i.e., MRA) among a plurality of frequency bands. In addition, claim 1 recites the feature of an authentication data embedding portion operable to embed authentication data in transform coefficients of the frequency bands exclusive of the MRA among the plurality of frequency bands.

Thus, according to claim 1, a first type of data (i.e., key data) is embedded in transform coefficients of a lowest frequency band (i.e., MRA), and a second type of data (i.e., authentication data) is embedded in transform coefficients of frequency bands other than the

lowest frequency band. Applicants respectfully submit that the Nakamura and Barton fail to teach or even remotely suggest this particular combination of features.

Nakamura discloses an apparatus for embedding watermark information in image data (see Figs. 1 and 6). As shown in Fig. 1 of Nakamura, an embedding coefficient-selecting section 13 reads an initial value of a random sequence 31, which is generated by a random-number-generator 119, and a random sequence is generated by using the initial value of the random sequence 31 (see Fig. 1; col. 5, lines 47-50; and col. 8, lines 45-49).

The random number generator 119 of Nakamura generates one random number for every bit of the watermark information (identified as element 4 in Fig. 1, and as element 104 in Fig. 6) (see col. 8, lines 45-46). The generated random numbers generated for respective bits of the watermark information are then used by an information embedding section (identified as element 12 in Fig. 1, and as element 121 in Fig. 6) to select coefficients in a low frequency domain from among the M x N x T coefficient matrix (see Fig. 6, element 115) to thereby embed the watermark information (14, 104) in the coefficients (see col. 5, lines 51-57; and col. 8, lines 57-67).

As noted above, Figs. 1 and 6 of Nakamura depict an apparatus which embeds watermark information in image data. Fig. 3 of Nakamura, on the other hand, depicts an apparatus which reads the embedded watermark information (see col. 6, lines 16-18). In particular, in Fig. 3 of Nakamura, the initial value of the random sequence 31, which is used at the time of embedding the watermark information (as described above with respect to Figs. 1 and 6), is read by an embedding coefficient selecting section 22, and a random sequence is generated by using the initial value of the random sequence 31 (see col. 6, lines 32-36).

Next, in Nakamura, coefficients from which the watermark information 4 will be read are determined using the random sequence in the embedding coefficient selecting section 22 (see col. 6, lines 36-40), and in order to obtain the coefficients, the section-for-computing-coefficient-to-be-processed 23 carries out orthogonal transformation for each block (see col. 6, lines 44-47). Finally, an information reading section 24 reads each bit of the embedded watermark information 4 from the obtained coefficients, and the embedded watermark information is output (see col. 6, lines 51-54).

In the Advisory Action, the Examiner asserted that the initial value of the random sequence 31 corresponds to the "key data" as recited in claim 1, and also cited to elements 22 and 23 of Fig. 3 as corresponding to the key data embedding portion.

Accordingly, as claim 1 recites that the key data embedding portion is operable to embed the key data in transform coefficients of a lowest frequency band, the Examiner is taking the position that elements 22 and 23 embed the initial value of the random sequence 31 in a transform coefficient of the lowest frequency band. Applicants respectfully disagree.

First, Applicants note that Nakamura fails to even explicitly mention data being embedded in transform coefficients of a lowest frequency band. Nakamura sets forth that the "information-embedding-section 121 selects one coefficient ... in a low frequency domain from amongst the M x N x T coefficient matrix" (emphasis added) (see col. 8, lines 62-64). However, Applicants respectfully point out that this disclosure in Nakamura merely indicates that all of the coefficients in Nakamura to which the watermark information is to be embedded are selected from a low frequency domain.

As described at col. 52, lines 3-8, Nakamura embeds the watermark information in

coefficients in a low frequency domain because such an area is not susceptible to influence from information compression, and therefore, reading of the embedded watermark information 4 can be reliably carried out (see col. 52, lines 3-8).

Thus, while Nakamura discloses embedding watermark information in coefficients of a low frequency domain, there is absolutely no discussion regarding a first type of data (i.e., key data) being embedded in coefficients of a lowest frequency band among a plurality of frequency bands, and a second type of data (i.e., authentication data) being embedded in coefficients of frequency bands other than the lowest frequency band.

Second, as noted above, element 22 of Nakamura is an embedding coefficient selecting section and element 23 is a section for computing a coefficient to be processed. Applicants respectfully submit that these elements in no way whatsoever perform the function of embedding the initial value of the random sequence 31 in transform coefficients of a lowest frequency band.

For example, the initial value of the random sequence 31, which the Examiner asserts corresponds to the "key data", is clearly not embedded in a coefficient. Instead, as described above, the initial value of the random sequence 31 is merely used to select which of the coefficients will be embedded with the watermark information 4.

In view of the foregoing, Applicants respectfully submit that Nakamura fails to disclose or suggest the feature of a key data embedding portion operable to embed key data in transform coefficients of a lowest frequency band (i.e., MRA) among a plurality of frequency bands. Further, Applicants respectfully submit that Barton fails to cure this deficiency of Nakamura.

If the Examiner disagrees with Applicants comments above, Applicants kindly request the Examiner to explain with particularity how the elements in Nakamura perform the above-

noted feature.

Further, as discussed above, claim 1 also recites the feature of an authentication data embedding portion operable to embed the authentication data in transform coefficients of the frequency bands exclusive of the MRA. The Examiner has cited to column 8, line 31 through column 17, line 46 of Nakamura as allegedly disclosing this feature.

As noted above, Nakamura discloses that the "information-embedding-section 121 selects one coefficient ... in a low frequency domain from amongst the M x N x T coefficient matrix" (emphasis added) (see col. 8, lines 62-64). However, Applicants respectfully point out that this disclosure in Nakamura merely indicates that all of the coefficients in Nakamura to which the watermark information is to be embedded are selected from a low frequency domain.

Thus, while Nakamura discloses embedding watermark information in coefficients of a low frequency domain, there is absolutely no discussion authentication data being embedded in coefficients of frequency bands other than the lowest frequency band. Further, Applicants respectfully submit that Barton fails to cure this deficiency of Nakamura.

In view of the foregoing, Applicants respectfully submit that Nakamura fails to disclose or suggest the feature of an authentication data embedding portion operable to embed the authentication data in transform coefficients of the frequency bands exclusive of the MRA. Further, Applicants respectfully submit that Barton fails to cure this deficiency of Nakamura.

If the Examiner disagrees with Applicants comments above, Applicants kindly request the Examiner to explain with particularity what elements in Nakamura are being relied upon as teaching the above-discussed feature by pointing to specific elements and specific passages in Nakamura.

Further, Applicants note that claim 1 recites that the authentication data is generated from a pseudo-random number series. As noted above, the Examiner is relying on the disclosure of Nakamura at col. 5, lines 48-51 for the generation of a random sequence of numbers, and is relying on Barton for the teaching of authentication data. However, Applicants respectfully submit that there is absolutely no teaching in the cited references that would suggest to one of ordinary skill in the art that it would have been desirable to generate the authentication data of Barton from the pseudo-random number series of Nakamura.

In particular, as noted above, the random sequence generated in Nakamura is used to select coefficients to which the watermark information 4 will be embedded. Accordingly, as Nakamura provides watermark information to be embedded in coefficients, Applicants respectfully submit that there is no reason that one of ordinary skill in the art would use the random sequence of Nakamura to generate authentication data, as suggested by the Examiner in the Office Action.

In the Advisory Action, the Examiner asserts that it would have been desirable to provide the method of Nakamura, which embeds authentication information, with the authentication stamp of Barton in order to provide security against unauthorized copying. Applicants respectfully submit that this motivation for combining the references is simply not convincing.

In particular, as the watermark information 4 of Nakamura is embedded in the coefficients to prevent illegal copying (see col. 52, lines 51-60), one of ordinary skill in the art would clearly see no need to generate the authentication data of Barton to be embedded in the coefficients. Indeed, incorporating such a feature in Nakamura would plainly be redundant and would serve no apparent purpose because the watermark information 4 is clearly disclosed in

Nakamura as being embedded in the coefficients for security purposes.

Moreover, Applicants note that there is absolutely no teaching or suggestion in Barton that the authentication data disclosed therein could be generated based on a value, such as a pseudo-random number.

Accordingly, if the Examiner maintains the rejection of claim 1, Applicants respectfully request that the Examiner to elaborate as to why one of ordinary skill in the art would generate the authentication data of Barton to be embedded in coefficients of Nakamura, taking into consideration that Nakamura already provides watermark information that is embedded into the coefficients for security purposes.

Further, Applicants kindly request the Examiner to explain how the combination of Nakamura and Barton teaches the feature of generating authentication data from the pseudo-random number series.

In view of the foregoing, Applicants respectfully submit that the cited prior art fails to disclose, suggest or otherwise render obvious all of the features of claim 1. Accordingly, Applicants submit that claim 1 is patentable over the cited prior art, an indication of which is respectfully requested. Claim 2 depends from claim 1 and is therefore considered patentable at least by virtue of its dependency.

In addition, Applicants note that claim 2 recites that the authentication data embedding portion embeds the authentication data in each transform coefficient of the MRR by comparing an absolute value of the transform coefficient with a set value T, and if the absolute value is less than the set value T, setting the transform coefficient to the set value +m or -m depending on a bit value of the authentication data to be embedded, and if the absolute value is not less than the

set value T, setting the transform coefficient to an even or odd integer near to the value q depending on the bit value of the authentication data to be embedded.

The Examiner alleges in the Office Action that Nakamura discloses such a feature and references Figs. 2, 17 and 48; col. 18, lines 9-57; col. 35, line 25 - col. 37, line 38; col. 1, line 65 - col. 2, line 18; and col. 7, line 55 - col. 8, line 28 in support thereof. Applicants respectfully submit that the figures and sections of the specification cited by the Examiner do not disclose or suggest the above-noted feature recited in claim 2.

For example, Nakamura makes no mention of comparing an absolute value of the transform coefficient with a set value T, and setting the transform coefficient to +m or -m, or an even or odd integer depending on the result. If the Examiner maintains the rejection of claim 2, Applicants request that the Examiner specifically point out the column and line number of Nakamura that discloses this feature, and explain how such disclosure corresponds to the above-noted feature in claim 2.

Moreover, Applicants submit that Barton fails to cure this deficiency of Nakamura. In view of the foregoing, Applicants submit that claim 2 is patentable over the cited prior art, an indication of which is respectfully requested.

Applicants note that the Examiner did not responds to the above-noted argument in the Advisory Action. In accordance with MPEP 707.07(f), "where applicant traverses any rejection, the examiner, should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it" (emphasis added). Thus, if the Examiner maintains the rejection of claim 2, Applicants respectfully request that the Examiner answer the substance of Applicants' argument in the next Office paper.

Regarding claim 3, Applicants submit that this claim is patentable over the cited prior art for at least similar reasons as discussed above with respect to claim 1.

For example, claim 3 recites the features of a key data extraction portion operable to extract key data embedded by a specific apparatus from transform coefficients of a lowest frequency band among a plurality of frequency bands (i.e., MRA); an authentication data generation portion operable to generate a pseudo-random series by using the key data, and to generate authentication data from the pseudo-random number series; and an embedded information extraction portion operable to extract embedded information embedded based on the key data by the specific apparatus from transform coefficients of frequency bands exclusive of the MRA among the plurality of frequency bands.

Accordingly, for at least similar reasons as discussed above with respect to claim 1, Applicants submit that the combination of Nakamura and Barton fails to disclose, suggest or otherwise render obvious such features. Thus, Applicants submit that claim 3 is patentable over the cited prior art, an indication of which is respectfully requested.

Claims 4-6 depend from claim 3 and are therefore considered patentable at least by virtue of their dependency. In addition, regarding claims 5 and 6, Applicants submit that these claims are patentable for at least similar reasons as discussed above regarding claim 2.

Regarding claims 7 and 13, Applicants submit that these claims are patentable over the cited prior art for at least similar reasons as discussed above with respect to claim 1.

For example, claims 7 and 13 recite the features of generating a pseudo-random number series by using predetermined key data, and generating authentication data from the pseudo-random number series; embedding the key in transform coefficients of a lowest frequency band

(i.e., MRA) among a plurality of frequency bands; and embedding authentication data in transform coefficients of frequency bands exclusive of the MRA among the plurality of frequency bands.

Accordingly, for at least similar reasons as discussed above with respect to claim 1, Applicants submit that the combination of Nakamura and Barton fails to disclose, suggest or otherwise render obvious such features. Thus, Applicants submit that claims 7 and 13 are patentable over the cited prior art, an indication of which is respectfully requested.

Claim 8 depends from claim 7, and claim 14 depends from claim 8. Accordingly, Applicants submit that these claims are patentable at least by virtue of their dependency. In addition, Applicants submit that claims 8 and 14 are patentable for at least similar reasons as discussed above regarding claim 2.

Regarding claims 9 and 15, Applicants submit that these claims are patentable over the cited prior art for at least similar reasons as discussed above with respect to claim 1.

For example, claims 9 and 15 recite the features extracting key data embedded by a specific apparatus from transform coefficients of a lowest frequency band (i.e., MRA) among a plurality of frequency bands; generating a pseudo-random series by using the key data, and generating authentication data from the pseudo-random number series; and extracting embedded information embedded based on the key data by the specific apparatus from transform coefficients of frequency band exclusive of the MRA among the plurality of frequency bands.

Accordingly, for at least similar reasons as discussed above with respect to claim 1, Applicants submit that the combination of Nakamura and Barton fails to disclose, suggest or otherwise render obvious such features. Thus, Applicants submit that claims 9 and 15 are

patentable over the cited prior art, an indication of which is respectfully requested.

Claims 10-12 depend from claim 3, and claims 16-18 depend from claim 15. Accordingly, Applicants submit that these claims are patentable at least by virtue of their dependency. In addition, regarding claims 11, 12, 17 and 18, Applicants submit that these claims are patentable for at least similar reasons as discussed above regarding claim 2.

II. New Claim

Claim 19 has been added by this amendment. Claim 19 recites the feature of a band division portion operable to divide a digital image signal of an entire image on which no block division is performed into a plurality of frequency bands. Applicants submit that the cited prior art fails to teach or suggest at least this feature recited in claim 19.

For example, in Nakamura, an entire image is divided into blocks by a block-section 11, and thereafter, a band division process is performed on each of the blocks to obtain a transform coefficient of each frequency band (see col. 5, lines 41-46).

Accordingly, as Nakamura divides an entire image into blocks and then performs a band division process, Applicants respectfully submit that Nakamura does not disclose or suggest the feature of a band division portion operable to divide the digital image signal of an entire image on which no block division is performed into a plurality of frequency bands, as recited in new claim 19. Further, Applicants respectfully submit that Barton fails to cure this deficiency of Nakamura.

In view of the foregoing, Applicants submit that claim 19 is patentable over the cited prior art, an indication of which is respectfully requested.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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